

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES  
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Daniel W. Cushing et al.  
Serial No.: 10/707, 612  
Filed: 12/24/2003  
For: Translucent, Flame Retardant Composite Materials  
Art Unit: 1771  
Examiner: Andrew T. Piziali

Attorney Docket No.: 03-1090

To: Attention: Board of Patent Appeals and Interferences  
Commissioner for Patents  
P. O. Box 1450  
Alexandria, Virginia 22313-1450

Appellant's Brief (37 C.F.R. 41.37)

This Brief is in furtherance of the Notice of Appeal filed in this case on June 21, 2007.

The Brief is being filed via EFS-Web. The fee required by this Brief is being charged to Deposit Account Number 50-3195 via EFS-Web concurrently with the filing of this Brief.

The Real Party in Interest (37 C.F.R. 41.37(c)(1)(i))

The real party in interest is THE BOEING COMPANY, the assignee of record.

Related Appeals and Interferences (37 C.F.R. 41.37 (c) (1) (ii))

There are no related appeals and interferences.

Status of Claims (37 C.F.R. 41.37 (c) (1) (iii))

Claims 1, 2, 4 and 5 were finally rejected by the Examiner in the office action dated March 9, 2007.

Claims 6-18 and 40 have been withdrawn from consideration.

All other claims (3, 19-39) have been canceled.

Among the claims currently under consideration, claim 1 is the sole independent claim. Claims 2, 4 and 5 directly or indirectly depend on claim 1.

No claims have been allowed.

The rejections of claims 1, 2, 4 and 5 are being appealed.

Status of Amendments (37 C.F.R. 41.37 (c) (1) (iv))

No amendment to the claims after final rejection was proffered. A response after final rejection was filed on April 30, 2007 and resulted in the Advisory Action dated May 8, 2007, in which the rejection of claims 1, 2, 4, and 5 under 35 U.S.C. 112 is withdrawn.

Summary of Claimed Subject Matter (37 C.F.R. 41.37 (c) (1) (v))

The subject matter defined in claim 1 is of a two-layer composite material for use in translucent, flame-resistant components. The composite of claim 1 comprises a substantially continuous nonwoven thermoplastic polyphenylsulfone substrate and a plurality of long glass fibers laminated within the substrate. The long glass fibers have a melting temperature above the melting temperature of the substrate and are selected from long s-type glass fibers and long e-type glass fibers. The composite material has an average allowable heat release not exceeding a 65/65 standard and can be post processed by bending, cutting or thermoforming.

Claim 2 recites a composite material of claim 1 wherein the long glass fibers are unidirectional, i.e., a preferred feature.

Claim 4 recites a composite material of claim 1, used as a translucent flame-resistant components for aircrafts. Claim 5 is dependent on claim 4 and recites the various forms of using the composite material on an aircraft.

Ground of Rejection to Be Reviewed on Appeal (37 C.F.R. 41.37 (c) (1) (vi))

It is requested that following ground of rejection (35 U.S.C. 103(a)) set forth in the final office action dated March 9, 2007, is to be reviewed on appeal.

1. Claims 1, 2, 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. Appl. Publ. 2004/0219855 to Tsotsis in view of USPN 5,319,003 to Gomez et al.

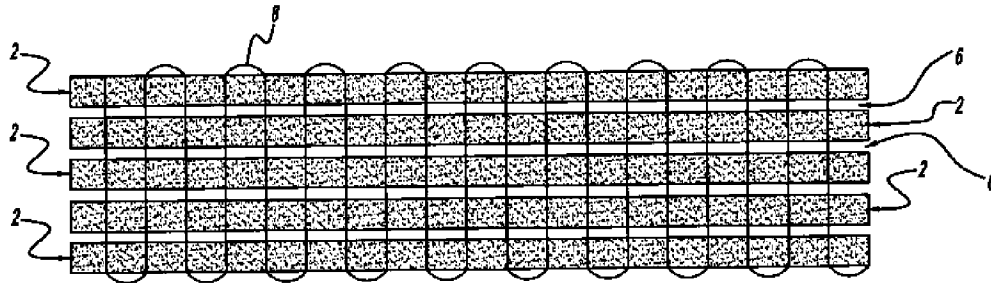
The other ground of rejection set forth in the same final office action, based on 35 U.S.C. 112, has been removed by the Examiner in the Advisory Action dated May 8, 2007 in view of the applicants' arguments dated April 30, 2007.

Arguments (37 C.F.R. 41.37 (c) (1) (vii))

1. Rejection of claims 1, 2, 4 and 5 under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. Appl. Publ. 2004/0219855 to Tsotsis in view of USPN 5,319,003 to Gomez et al.

Tsotsis is directed to composite materials and namely multiaxial fabrics comprising reinforcing layers of unidirectional fibers with nonwoven layers disposed between the reinforcing layers and melt-bonded to at least one of the reinforcing layers.

The reinforcing layers are fabric layers and specifically fabric layers of unidirectional fabrics (see paragraph 0037 and Fig. 2, the latter is produced below).



**FIG - 2**

In Fig. 4 and paragraph 0043, the process for making the preform is illustrated and the layup of unidirectional fabric layers is described. Clearly fabrics are involved. In contrast, nonwoven, non-fabric composites are disclosed and claimed in the present invention.

The distinction between nonwoven and fabrics is well established and well documented. Attention is called to the Complete Textile Glossary published by Celanese Acetate LLC (copies of pertinent pages enclosed) in which “fabric is defined as a planar textile structure produced by interlacing yarns, fibers or filaments” and nonwoven fabric is defined as “An assembly of textile fibers held together by mechanical interlocking in a random web or mat, by fusing of the fibers (in the case of thermoplastic fibers), or by bonding with a cementing medium such as starch, glue, casein, rubber, latex, or one of the cellulose derivatives or synthetic resins. Initially, the fibers may be oriented in one direction or may be deposited in a random manner. This web or sheet of fibers is bonded together by one of the methods described above. Normally, crimped fibers that range in length from 0.75 to 4.5 inches are used. Nonwoven fabrics are used for expendable items

such as hospitable sheets, napkins, diapers, wiping cloths, as the base material for coated fabrics, and in a variety of other applications. They can also be used for semi-disposable items and for permanent items such as interlinings.”

The Examiner has acknowledged that Tsotsis is silent with respect to specific glass fibers and relies on Gomez to provide this teaching. It is his opinion that it would have been obvious to one skilled in the art at the time the invention was made to make the glass fibers from s-type or e-type glass fibers as taught by Gomez motivated by the expectation of success fully practicing the invention of Tsotsis.

Gomez is directed to a process for making a composite article which comprises contacting at least one continuous filament with a mixture comprising a resin and a strain relieving polymer. The continuous filaments can be made of polyaramid fiber, graphite fiber, glass fiber, boron fiber and combinations thereof. The types of fibers are illustrated by examples (column 3) and glass fibers illustrated by E-type, S-type, A-type and C-type.

Gomez teaches a process for forming a reinforced resin composite by coating continuous filament with a thermosetting mixture of a resin and a strain relieving polymer. According to Gomez, the thermosetting mixture more specifically comprises “i) a resin selected from the group consisting of unsaturated polyester resins, vinyl ester resins, and mixtures thereof; ii) a styrene monomer; and iii) a thermoplastic polymer (claim 1 of Gomez). It is the continuous filament which can be a glass fiber (more specifically identified at column 3, lines 28 et seq.) as recited by Gomez. The coated filaments are formed into the desired shape and the thermosetting mixture cured. The process and product are very different from those of Tsotsis and because of their nature

would not suggest modifications to be made to the Tsotsis' highly porous interlays to toughen liquid molded fabric based composites.

Claim Appendix (37 C.F.R. 41.37 (c) (1) (viii))

A clean copy of the claims in the case is submitted herewith.

Claim 1. A two-layer composite material for use in translucent, flame-resistant components comprising:

a substantially continuous nonwoven thermoplastic polyphenylsulfone substrate;  
and

a plurality of long glass fibers having a melting temperature above the melting temperature of said polyphenylsulfone and laminated within said polyphenylsulfone substrate, wherein said plurality of long glass fibers is selected from the group consisting of a plurality of long s-type glass fibers and a plurality of long e-type glass fibers, wherein said composite material has an average allowable heat release not exceeding a 65/65 standard and can be post processed by bending, cutting or thermoforming.

Claim 2. The two-layer composite material of claim 1, wherein said plurality of long glass fibers comprises a plurality of unidirectional long glass fibers.

Claim 4. The two-layer composite material of claim 1, wherein said translucent, flame-resistant components comprises an interior component contained within a commercial aircraft.

Claim 5. The two-layer composite material of claim 4, wherein said interior component is selected from the group consisting of a countertop, a cabinet enclosure, a tray table, a backlit lighted sign, an illuminating window panel, a window bezel, a class divider, a privacy partition, a backlit ceiling panel, a direct lighting ceiling panel, a

backlit control panel, a lighted door, a lighted door latch, a doorway lining, a proximity light, a stow bin door, a privacy curtain, a translucent door handle, a translucent amenities cabinet, a translucent sink deck, a doorway liner, a stow bin latch handle, and a lighted phone.

Evidence Appendix (37 C.F.R. 41.37 (c) (1) (ix))

No evidence pursuant to §§ 1.130, 1.131 or 1.132 of 37 C.F.R. or evidence entered by the Examiner and relied on by the applicant is present.

Related Proceedings Appendix (37 C.F.R. 41.37 (c) (1) (x))

There are no related appeals and interferences.

Summary

The cited references when taken alone or in combination do not teach or suggest the claimed invention. It is thus respectfully requested that the Examiner's rejection of claims be reversed.

Waiver of Oral Hearing

Applicants will rely on their Brief on Appeal and waive their right to present oral arguments at a hearing.

Respectfully Submitted,  
Attorney for Applicant

Dated: August 20, 2007

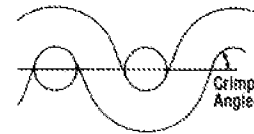
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**FABRIC:** A planar textile structure produced by interlacing yarns, fibers, or filaments.

**FABRIC CONSTRUCTION:** The details of structure of fabric. Includes such information as style, width, type of knit or weave, threads per inch in warp and fill, and weight of goods.

**FABRIC CRIMP:** The angulation induced between a yarn and woven fabric via the weaving or braiding process.



**FABRIC CRIMP ANGLE:** The maximum acute angle of a single weaving yarn's direction measured from a plane parallel to the surface of the fabric.

Fabric Crimp Angle

**FABRIC SETT:** The number of warp threads per inch, or other convenient unit.

**FABRIC STABILIZER:** Resin or latex treatment for scrim used in coated fabric manufacture to stabilize the scrim for further processing.

**FACE:** The correct or better-looking side of a fabric.

**FACING:** A lining or trim that protects the edges of a garment especially at collars, cuffs, and front closings.

**FACONNÉ:** A broad term for fabrics with a fancy-type weave made on a Jacquard or dobby loom.

**FADE-OMETER®:** Laboratory device used to determine the fastness of a colored fabric to exposure to light. The test pieces are rotated around a light source simulating the sun's rays at 45° N latitude in July between the hours of 9 a.m. and 3 p.m. Fabrics are rated by visual comparison with a gray scale according to degree of fading.

**FAILLE:** A soft, slightly glossy woven fabric made of silk, rayon, cotton, wool, or manufactured fibers or combinations of these fibers and having a light, flat crossgrain rib or cord made by using heavier yarns in the filling than in the warp.

**FALSE-TWISTING:** See TEXTURING, False-Twist Method.

**FANCY YARN:** See NOVELTY YARN.

**FASCIATED YARN:** Yarns consisting of a core of discontinuous fibers with little or no twist and surface fibers wrapped around the core bundle.



Fasciated Yarn



**NONWOVEN FABRIC:** An assembly of textile fibers held together by mechanical interlocking in a random web or mat, by fusing of the fibers (in the case of thermoplastic fibers), or by bonding with a cementing medium such as starch, glue, casein, rubber, latex, or one of the cellulose derivatives or synthetic resins. Initially, the fibers may be oriented in one direction or may be deposited in a random manner. This web or sheet of fibers is bonded together by one of the methods described above. Normally, crimped fibers that range in length from 0.75 to 4.5 inches are used.

Nonwoven fabrics are used for expendable items such as hospitable sheets, napkins, diapers, wiping cloths, as the base material for coated fabrics, and in a variety of other applications. They can also be used for semi-disposable items and for permanent items such as interlinings.

**NOVELTY YARN:** A yarn produced for a special effect. Novelty yarns are usually uneven in size, varied in color, or modified in appearance by the presence of irregularities deliberately produced during their formation. In singles yarns, the irregularities may be caused by inclusion of knots, loops, curls, slubs, and the like. In plied yarns, the irregularities may be effected by variable delivery of one or more yarn components or by twisting together dissimilar singles yarns. Nub and slub are examples of novelty yarns.

**NOVOLOID FIBER:** A manufactured fiber containing at least 85% by weight of a cross-linked novolac (FTC definition). Novoloid is flame resistant and nonmelting. Its primary use is in flame-protective garments and products.

**NOZZLE:** 1. The spout through which something is discharged, i.e., oil in finish application or fibers in web laying. 2. A term sometimes used to refer to spinnerets.

**NUB YARN:** A novelty yarn containing slubs, beads, or lumps introduced intentionally.

**NUCLEATION:** A process by which crystals are formed. Crystals form initially on minute traces of foreign substances that act as the nucleus, then grow by external addition.

**NUN'S VEILING:** A soft, lightweight, plain-weave fabric that usually comes in black and white, nun's veiling is a rather flimsy, open fabric but always of high quality. It may be made from fine woolen yarn or yarns spun from manufactured fibers such as nylon, acrylic, or polyester.

**NYLON FIBER:** A manufactured fiber in which the fiber forming substance is any long chain synthetic polyamide having recurring amide groups (-NH-CO-) as an integral part of the polymer chain (FTC definition). The two principal nylons are nylon 66, which is polyhexamethylenediamine adipamide, and nylon 6, which is polycaprolactam. Nylon 66 is so designated because each of the raw materials, hexamethylenediamine and adipic acid, contains six carbon atoms. In the manufacture of nylon 66 fiber, these materials are combined, and the resultant monomer is then polymerized. After polymerization, the material is hardened into a translucent ivory-white solid that is cut or broken into fine chips, flakes, or pellets. This material is melted and extruded through a spinneret while in the molten state to form filaments that solidify quickly as they reach the cooler air. The

